

NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	Handbook of Scour Countermeasures Designs		
RFP NUMBER: NJDOT #2002-11	NJDOT RESEARCH PROJECT MANAGER: Nazhat Aboobaker		
TASK ORDER NUMBER: RFCUNY 21 / 49777-11-04	PRINCIPAL INVESTIGATOR: Anil K. Agrawal		
Project Starting Date: Jan. 1, 2003 Original Project Ending Date: Dec. 31, 2004 Modified Completion Date:	Period Starting Date: Apr. 1, 2004 Period Ending Date: June 30, 2004		

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Literature Search	10	100	100	10
1. Dissemination of Literature Search	15	100	100	15
2. Selection and Analysis	25	85	100	25
3. Identification & Guidelines	30	50	50	15
4. Final Report	20	0	0	0
			0	0
TOTAL	100%			65%

Project Objectives:

The main goal of the “Handbook of Scour Countermeasures Designs” is to present practical solutions in a concise manner for use by a bridge design engineer. Since the type and effectiveness of a scour countermeasure depends on geological and hydraulic conditions at a particular location, the handbook will classify various scour critical bridges in New Jersey on the basis of:

- Different types of rivers in New Jersey
- Different functional classification of bridges, such as bridges located on interstates, minor arterial highways and local roads
- Geological conditions, e.g., locations of rocks in different counties in New Jersey.

Some of the important aspects of the development of the handbook are summarized in the following:

- The development of this Handbook will be based on an in-depth investigation and review of numerous technical publications and guidelines adopted by other DOTs on scour countermeasures for various types of scour conditions.
- In this research, existing theoretical and experimental studies on scour countermeasures carried out in USA and abroad will be utilized to identify and classify most appropriate technologies for scour countermeasures for a particular location for repeated use.
- The practical guidelines in the Handbook will assist engineers in the selection of appropriate technologies to facilitate the overall design of countermeasures for existing bridges and new constructions.

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- The Handbook will contain guidelines for application, design and construction of these selected permanent scour countermeasures for identified scour critical bridges in New Jersey.
- A chapter in the handbook will summarize the theoretical and experimental approach on the state-of-the-technology of various scour countermeasures for easy reference of the designers and engineers.
- These guidelines will also address the issue of emergency action countermeasures. Such countermeasures are important for less-critical bridges for which monitoring countermeasures (using instruments or visual inspection or both) are adopted.

Project Abstract:

Bridge engineers are presented with numerous tidal flow and non-tidal scour countermeasure designs for application to scour critical bridges. A wide variety of countermeasures are presented in the publications, such as HEC-23, Melville and Coleman (2000), Park (2000), NJDOT (1998), etc., to control channel instability and to mitigate scour at foundations of abutments and piers. These countermeasures are applicable to bridges with known foundations and unknown foundations (for which no drawing exists). The focus of this research will be the identification of technologies and solutions most appropriate for scour countermeasures of bridges in New Jersey. The selection of identified technologies will depend on factors such as structural type, stream geometry, stream soil conditions, and environmental constraints. Economic and cost effective technologies of countermeasures will be determined to match New Jersey resources and scour countermeasures for both existing structures and new bridge constructions. Identification of additional new technologies and innovative concepts, e.g., Gabion wire basket anchor block, Gabion mat, flexible channel liner, geo-textile containers, delta-wing-like-fin in front of bridge piers, slot through piers, submerged vanes, training walls, etc., will be investigated to analyze their potential of scour mitigation and cost-effectiveness. Appropriate guidelines for these additional countermeasures will be developed based on existing theoretical and experimental knowledge.

1. Progress this quarter by task:

Task 2 has been finished completely. More than half of the work in Task 3 is expected to be finished and submitted to the panel for review by this quarter.

2. Proposed activities for next quarter by task

The PI plans to submit draft final report in the next quarter. Individual chapters of the report will be submitted for detailed technical review during the current and the next quarter.

3. List of deliverables provided in this quarter by task (product date)

None

4. Progress on Implementation and Training Activities

None

5. Problems/Proposed Solutions: None

Total Project Budget	\$160,004
Modified Contract Amount:	
Total Project Expenditure to date	\$96,000
% of Total Project Budget Expended	60%

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